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ABSTRACT

This paper focuses on experiences with real-time communication in distance classes that contrast with the face-to-face setting from which teachers and students brought their teaching-learning perceptions and behavior. Observing the uncomfortable and unforeseen experiences that distance teachers and students have, the authors studied the reasons behind the barriers that are apparently there but difficult to describe. Three graduate distance courses in education, agriculture, and statistics were studied. All of the courses were using audiographic teleconferencing systems that were conducted in real-time. Most of the students were new to distance learning, and only one of the three instructors had some experience in teaching at a distance. All three courses had different content, teaching strategies, and student composition, and all of them shared communication problems that became significant. Teaching strategies, student reaction, and problems are described for each of the three courses. Border issues (i.e., peripheral elements that surround the technology being used) are discussed, specifically the lack of border elements such as body language that support effective face-to-face communication. (AEF)

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The Invisible Barriers in Teaching at a Distance

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Teaching at a distance can be a bewildering experience. Teachers with no or only some experience in distance education frequently encounter problems they did not expect. Although distance education formats vary to a great degree, the basic classroom structure has not changed a great deal. Whether it was done on television, teleconferences, or the Internet, most of the classes are still composed of lecturing, viewing instructional material, question-answering, doing group activities and so on. A class still consists of one instructor and many students that are dutifully sitting in front of a computer, television, or projection unit.

The following study and discussion focuses on experiences with real-time communication in distance classes that contrast with the face-to-face setting from which the teachers and students brought their teaching-learning perceptions and behavior. Many people who have taught in distance education settings describe the situation as familiar but unfamiliar. They grant that the class format looks familiar: long tables, regular chairs, students sitting in rows or circles, the instructor lecturing and students listening, and once in a while, a question or two asked. Students have final exams and perhaps projects to present during the classes. While these classroom practices are familiar, accomplishing them in a distance environment can be difficult and unfamiliar.

Observing the uncomfortable and unforeseen experiences that distance teachers and students have, the authors studied the reasons behind the barriers that are apparently there but hard to describe. In the following, we draw our inferences from three distance courses using teleconferencing systems (Hsu, 1997). First we'll take a closer look at the instances, and then we will propose a view that explains the phenomena.

Problems in Three Courses

Three semester-long graduate courses in three discipline areas, Education, Agriculture, and Statistics, were studied. All of them were using audiographic teleconferencing systems that were conducted in real-time, for three hours per night, one night per week, and fourteen weeks per semester. Most of the students were new to distance learning, and only one out of the three instructors had some experience teaching at a distance. All three courses had different content, teaching strategies, and student composition, and all of them shared communication problems that became significant.

Course I

The first course was about test construction and assessment for educators. Dr. K was one of three instructors that had taught the course at a distance. He had taught the course several

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times on campus in the past. From the beginning of the course, Dr. K was confident in how the course should be taught and how students should learn: "I had taught the same course on telnet (an audioconferencing system) before. I have that experience with nobody around me. I am not a novice at this (teaching at a distance); I am experienced."

Dr. K felt that he knew how to present the course so that the students would learn the content material. For example, the course project was the single most important thing in the course because a majority of the class time was used to discuss and present segments of the project. Instead of giving lectures and expecting memorization, Dr. K wanted the students to engage in the process of composing, discussing, and revising even though it was a slow process. Students' progress could only be observed over time. Dr. K placed great value on the students' presentation process. He saw group sharing as the basis for their growth and improvement, "When you are showing and telling, you become more critical through time. You develop a certain set of schemas that you use to draw a conclusions about the work."

Perhaps due to Dr. K's previous experiences in teaching audioconferencing, he seldom used the color pen to draw anything on the screen, and the computer display was mostly limited to black and white text. Moreover, Dr. K spent a lot of time on student's homework, project presentations, and discussion. While these activities had work well in the past, Dr. K encountered numerous problems. For reasons he did not foresee, students were frustrated from the beginning.

Students had problems communicating with the professor from the first days of the course. For example, when Dr. K went through the course syllabus, course requirements, and the packet of readings with examples of projects, students had many questions. The audio was a little muffled at times, and sometimes students had to ask each other to repeat the questions or answers. During the first few meetings, there was be confusion regarding how to do the assignment from the examples and handouts the teacher had provided. One student stated later: "I hesitated to ask questions. Sometimes our questions weren't really answered, so we figured that we should just forget it. We were not going to ask questions anymore." Because of numerous communication problems, the instructor's ideas about the course were not fully comprehended by the students. Students did not have a sense of the whole picture.

> I didn't see a clear picture, and it was not really the course that I had expected. I was frustrated from the beginning. I think it is much easier when you have a one-on-one interaction with somebody, whether it is your colleague or your professor, to clarify the information. It is difficult to do so over distance. I don't know whether it was the information being presented or whether it was the equipment. It was probably fifty-fifty.

Some of the instructor's philosophies and strategies were not accepted by the students. This mismatch between the teacher's and students' teaching-learning strategies was further aggravated by the lack of communication. While some students struggled to understand the instructor's intent, many others gave up trying. Students with these two opposing views and attitudes formed two distinct groups. One group felt frustrated by the technology, but strived to survive the course. The other group appeared to like the course and the technology initially, but developed loud complaints. A lengthy period of arguing and shouting, complaining and criticizing in a class at the end of the semester shocked everyone. The second group revealed their long-held frustrations, anger, and dissatisfactions.

Course II

Dr. B always wanted his classes to be interactive. As a professor in a science field, he knew it was not part of the tradition of class behavior for graduate students: "Students do not ask questions, period." He encouraged interaction because he believed in its value in the education process, and because of his wish to learn more about his students: "I figure they invested a fair amount of money and time to come to the class, so the least I can do is to figure out who they are." He also saw the potential usefulness in learning more about students.

> If I know their names, I'm more free to call on them in class. When you ask a student to answer a question, other people are thinking, because they know I may call on them next. So they can learn more from each other. If I know somebody is a fertilizer dealer in my off-campus class, I can say, "Hey, John, what happens to the pH of the nitrogen when you put it on the corn ground?" Other students can then start seeing some practical value to this, or some practical connection between the real world and what I am teaching.

Dr. B used a range of strategies to connect to his students and to encourage interaction. He prepared handouts for students that were taken from the lecture notes on the screen, so the students would have something to refer to when they got lost in class or when they were studying at home. As he went through the lecture notes during the class, he circled, highlighted, pointed at the important text and graphics. Dr. B called himself "the worlds greatest doodler," as he annotated the several hundred digitized slides he had taken from the field. He often used jokes and humor to make his students feel at ease. On student reported, "Some of the stuff is corny, so it's funny. They are just kind of off-the-wall things that are humorous. If he was serious all the time , I know I wouldn't be enjoying the class as much. When you get up around my age, you enjoy humor in your work."

As much as Dr. B tried to obtain students' feedback by soliciting questions from individuals and groups, he was frequently unsuccessful. The reason for students' lack of responses, however, was not because they did not know the answers or were unwilling to answer. No one knew how to do it in this setting. As one student put it,

> He probably thinks no one answers the questions, but lots of times, if he had video, he could look around and people would be shaking their heads, saying "yes" or "no," but they won't speak up. Sometimes, just about the time I speak up, someone from one of the other locations is going to speak up also. So, like in a real classroom setting, if he asked a question and he looked up at the class, he could see the students are saying yes or no. They just shake their heads. That doesn't work here.

Dr. B used many other strategies. Some of them worked, and some did not. Students still ranked their level of satisfaction high at the end of the semester. Some of them wished they had been in a face-to-face environment.

Course III

The statistics teacher, Dr. S, knew she had to adjust her teaching strategies in order to teach her distance class. She had taught the same course before in a face-to-face setting. Dr. S

devised a number of strategies she thought would be helpful in a distance class. The following are techniques Dr. S implemented to promote interaction and overcome distance.

Writing on the screen. Initially, Dr. S planned to do a lot of writing during her lectures. She created many slides with only a few words or a headline and the rest of the page blank. Although it was awkward to talk and write using the electronic pen, she intended to become proficient with it. When the course started, Dr. S found quickly that writing on the screen was different from writing on the blackboard. To draw lines, for instance, she had to wait for the time lag of sending electronic data. This prevented the instructor and the students from experiencing instantaneous communication as they would when writing on a blackboard in a face-to-face situation. After a few trials of writing out formula in the blank area, Dr. S gave up writing on the computer screen, and prepared her lecture slides with all the words and equations already typed.

Encouraging students to talk. In her teaching, Dr. S valued verbal and nonverbal feedback from the students: "They didn't have to speak up. They could have made some faces, joked a little bit, or nodded their heads." Foreseeing that she would not have these types of responses in a distance course, she explicitly asked the students to express their feelings: "Tell me what you think. Tell me if I am going too fast or too slow." When the class started, however, most of the students did not respond to her, no matter how much she asked. According to the students, most of them knew Dr. S welcomed their questions, and they had no difficulty talking into the microphone. Their problems concerned not whether to ask a question, but when and how to ask: "Without the visual cues, you're playing more of a guessing game as to when is the appropriate time to break in or ask." One student pointed out, "You just have more of a tendency to just let it go on and on. Whereas, if she were there in person, I think you're more apt to break in."

Telephone trees. Having the students exchange phone numbers was another way Dr. S encouraged students to interact with one another. She was aware that the students were not all at the same site and that they had limited opportunity to communicate. Dr. S paid special attention to getting students at different locations to talk to each other. Based on past experience, Dr. S believed that students would be more inclined to call each other if they did so outside of class. Dr. S wanted to establish a telephone tree, or as she called it "telephone buddies," in the class. This did not work, however. Students did not want to pay for long-distance phone calls for potentially prolonged questions about homework and exercises. They simply discussed problems with their classmates at their respective sites on class night. Despite the fact that the instructor tried to bring the class together, no sense of a class as a whole ever occurred. Students related and interacted almost exclusively with others at their respective sites.

Interpreting the Problems

Using teleconferencing in distance education presents an environment that is familiar but also not familiar to teachers who are used to a face-to-face situation. In cases studied, the technology used was visible but also invisible to the participants. Although plenty of machines were in the room, the technology was intended to be relatively transparent and trouble-free, so that the teaching and learning processes could take place without anyone focusing on the medium.

What actually occurred in the classes, however, was something else. The instructors and the students found that the medium made teaching and learning awkward. The technology was more than just a passive transmission medium, it actively affected interaction. Asking questions using the microphone, for example, was not the same as talking face-to-face. This problem occurred in all three classes studied. When talking to the teacher, no student seemed to have a problem speaking at the right angle into the microphone box, but they did have problems communicating. The problems that occurred were not with the machines themselves, but with the machines-in-use. It was not with the speaker or microphone per se, but with the integration of the technology into the act of speaking.

Examining this further, we know that when asking a question, for instance, there needs to be a mutual agreement about when and how a question can be asked. One needs cues such as a nodding head, an inquisitive look, an inviting gesture, or a pause between sentences. These cues are as essential to the communication process as the medium that transmits the voice. These elements are what Brown and Duguid (1993) would call "borders."

The Border Issues

According to Brown and Duguid (1993), the development of a community of technology users produces an array of peripheral elements—"the borders" that surround the technology being used. Brown and Duguid give many examples from daily life where the border elements help define the meanings in a situation. In the case of an encyclopedia, for example, the degree of accuracy and authority of its information is signaled in part by the hefty hard cover of the volume that is expensive for publishers to reproduce. When encyclopedias are produced electronically, on the World Wide Web for instance, the digital forms do not carry the same cues to accuracy and authority as the hard covers. This affects how a person uses the information.

Similar experiences were observed in the distance classes studied. In a distance setting, many previously used border elements that have supported effective face-to-face communication are no longer available. Participants may not notice exactly what is missing, but they may experience difficulty in carrying out or interpreting particular acts of communication.

In the case of question-answering activities, for example, teachers and students a rely on border elements such as body language to interpret each other in a face-to-face class. In the distance classes studied, when visual cues were no longer available, students became quite sensitive to what the teacher said and interpreted the words with known elements such as tone of the voice, length of a pause, and the actions taken right after the words were spoken. In all three classes, and especially in the education and agriculture courses, students assessed the appropriateness of their answers, the "okay or not" responses from the teacher and the reactions of their classmates using available, known elements.

Sometimes, the students focused on border elements that conveyed a meaning different from the words because those elements were weighted more in the students' minds. One of the female students in the education course, for instance, did not believe the instructor's praising words "It's a good job," but instead believed what the instructor's tone of the voice seemed to her to imply, a negative appraisal of her work, "God, is she stupid!" Students at one site in the statistics course felt that their classmates at the other site did not like them

because of the way the other students responded. This affected interaction between students at the two sites. Especially when there are few known and available elements for a given context, the meaning that gets transmitted by speaking is powerfully affected. In cases where the border elements are absent or unknown, as seen in the stories, a joke can be taken as an offensive attack, and a suggestive remark can be interpreted as an imposing order.

Border elements are embedded in the context of the situation, and they are usually not recognized until one is engaged in the situation and has learned how they operate. When the new instructors were introduced to the distance learning environment and practiced technology by themselves, they did not realize what the process of teaching with it would be like. It was not until they began teaching with the technology that they discovered how the technology affected their teaching process. It is not surprising that Dr. S invited students' feedback by saying, "Ask me questions at anytime," or by saying "Feel free to interrupt me." Distance students found it difficult to comply. Since these comments are often used in a face-to-face setting, they sounded perfectly normal to the students. In the teleconferencing classrooms, however, some of the expected border elements were missing. The students and teachers did not have border elements appropriate for teaching and learning using distance technology enabling them to understand and convey the same meanings they could transmit in a face-to-face setting.

The problems of communicating teachers and students have encountered at a distance focuses our attention on the composition of everyday classroom communication practice in which a complex set of border elements are used. These surround the seemingly simple classroom action of raising a hand to ask a question, for example. Studying the teaching-learning process in a distance education setting, strongly suggests that we consider how to construct and use new border elements that embrace the new teaching-learning settings.

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